

Driving Factors of Cloud Accounting Implementation in Small and Medium Enterprises (SMEs): Evidence from Indonesia

H Ritchi^{*1}, B Yahya², R Dwiokta³, L P M Sugianto⁴

¹⁻⁴Universitas Padjadjaran, Indonesia

²Hankuk University, South Korea

E-mail: hamzah.ritchi@unpad.ac.id^{*1}, bernardo@hufs.ac.kr²,
roshi12001@mail.unpad.ac.id³, larasati.sugianto@unpad.ac.id⁴

Abstract. This paper attempts to identify the factors that affect Small and Medium Enterprises (SMEs) decisions in implementing cloud accounting systems in their business, particularly in Indonesia's Bandung region. Bandung greater area has long been recognized among the amiable regions for SME economic development. This research qualitatively analyzed primary data obtained through a series of in-depth interviews with SMEs key personnel regarding the opportunity of cloud-based accounting. The informants were eight key SMEs personnel selected for their relevant knowledge and experience in accounting and associated technology use. An expert-based validation was conducted on factors successfully identified at the coding stage. The findings indicate that seven decisive factors influence SMEs' decisions: security, usability, human resources, time, communication, cost, and functionality. This research offers insight into the implementation of cloud accounting in SMEs by filling the identified gap in the body of literature on cloud accounting and SMEs in particular developing economies.

Keywords: cloud computing, cloud accounting, cloud adoption, SMEs, driving factors

1. Introduction

Adapting to the fast-changing market dynamics is crucial, particularly for Small and Medium Enterprises (SMEs) susceptible to changes. To remain competitive in the market, SMEs could take advantage of cooperation with both internal and external stakeholders to optimize their resource management and achieve collective benefits [1]. Moreover, SMEs could realign their strategies to adapt to the development of technology and enhance their competitiveness [2]. Among various revolutionary emerging technologies that exist, SMEs could obtain considerable benefits from cloud computing, specifically cloud accounting [3], [4], [5], [6]. In contrast to traditional accounting software that should be purchased and installed on the user's hardware, cloud accounting offers similar functionalities with more flexibility by enabling access via the internet [7].

A survey conducted by Gartner in 2020 suggests that worldwide spending on cloud services would still have an upward trend, especially due to the Covid-19 pandemic, which was predicted to drive the growth of cloud computing by adding \$47.4 billion more in 2021 compared to the spending in 2020 [8]. In addition, an International Data Corporation (IDC) survey predicts that worldwide spending on cloud computing in 2024 will surpass \$1 trillion, with most revenues coming from the service category [9].

In line with the global upward trend, the growth of cloud computing in Indonesia also increased rapidly over the years. In 2019, Boston Consulting Group (BCG) reported that Indonesia was one of the Asia-Pacific countries with the highest growth in the cloud market, which was forecasted to raise the market size from \$0.2 billion in 2018 to \$0.8 billion in 2023 [10]. As long as the country is able to acquire highly skilled IT specialists, adequate infrastructures, reliable best practices, and established digital policies, Indonesia is expected to achieve a 25% cumulative annual economic impact and 635,000 employment impact solely from the public cloud [10]. These forecasts show that cloud computing is a promising technology that can be implemented in Indonesia.

Despite the promising forecast, the merit of cloud accounting is not linear with the adoption rate in Indonesia. A study on cloud adoption in the Asia Pacific region revealed that, based on 160 Indonesian respondents following the survey, they faced problems with adopting the cloud, namely privacy, security, immature technology, productivity, and no ownership [11]. It gets more concerning to the fact that only 59,6% of Indonesian SMEs use computers to run their business processes, thereby implying that many SMEs are unaware of the role of information systems in business [12]. In light of cloud accounting, only a small portion of SMEs are considering moving toward cloud accounting amid the trend in cloud computing [13]. This raises the question, "What factors drive Indonesian SMEs to adopt cloud accounting?". Given the importance of SMEs for Indonesia's economy and the paucity of empirical work on the threats and risks of cloud accounting, this research strives to identify factors deemed important for onboarding SMEs in the cloud accounting environment.

2. Literature Review

2.1. Cloud Computing in the Accounting Domain

Cloud computing benefits include but are not limited to cost reduction, ensuring data availability, improving data reliability, strengthening data security, and enhancing flexibility [6], [14]. As outlined by the National Institute of Standards and Technology (NIST), cloud computing services provide an alternative to traditional computing for cost-effective solutions, making it especially attractive for SMEs with limited IT budgets and resources. Although cloud computing has been a topic of interest for many, discussions about the implementation of cloud accounting on SMEs are very limited. On that account, the researchers referred to a lot of research on the cloud computing established in large enterprises' business processes as opposed to the cloud accounting in SMEs for this study.

Table 1. Literature on Cloud Computing Implementation

Reference	Methodology	Findings
[15]	Systematic Review	State of the art, advances, gaps, and new challenges of cloud computing.
[13]	Literature Review	Cloud accounting as a new business model and its influence as seen from different perspectives.
[16]	Literature Review	Concept, benefits, drawbacks, and other aspects affecting the accounting profession within the context of cloud accounting.

Reference	Methodology	Findings
[17]	Descriptive Analysis & Econometric Analysis	Cloud computing implementation in Southern European firms is mainly driven by cost reduction, while the Northern European firms are mainly driven by the transformation it offers.
[18]	Qualitative Method: Semi-Structured Interview	Risk mitigation strategies for accounting-specific processes and other cloud-based applications in implementing cloud accounting.
[14]	Literature Review	A short review of cloud computing concepts, characteristics, models, and the benefits and challenges of implementing cloud computing for SMEs.

As seen from Table 1 above, it is more difficult to find empirical research on cloud accounting implementation on SMEs given that previous literature on cloud accounting is mainly conceptual or nonempirical [13], [16]. Nonetheless, it can be concluded that implementing cloud accounting is deemed essential by many scholars. The state of the art, characteristic, impact, and risk mitigation strategies in implementing cloud computing have been examined and discussed in several references (see Table 1). Another past literature discusses the adoption of cloud computing in the supply chain and concludes that the complex decision to implement cloud computing is driven by four constructs namely environment, task, inter-organizational, and information processing capability, with details on the following. Firstly, the environment construct relates to data security, the global economy, vendor support, and cost. Secondly, task construct covers flexibility, functionality, access, and integration. Thirdly, the inter-organizational construct concentrates on communication and collaboration. Lastly, the information processing capability focuses on connectivity, usability, and collaboration [19]. However, this study analyzed large businesses, implying that the identified factors may not fully apply to SMEs.

Another study conducted in Malaysia concluded that the key determinants of cloud computing adoption are performance expectation, firm size, and absorptive capacity [20]. Those three key determinants are considered to be the driving factors due to their capabilities to support innovativeness, which positively affects firm performance. Unfortunately, the study solely analyzed Malaysian manufacturing companies, insinuating that the findings fully reflect the sector in that country. Given that no one has attempted to identify the driving factors of cloud accounting adoption for Indonesian SMEs, the researcher's discretion is required to apply the findings to SMEs in Indonesia. Established upon the extensive literature discussed above, this study aims to bridge the gap in conventional literature related to cloud accounting by utilizing a robust methodology to validate identified driving factors of cloud accounting implementation in Indonesian SMEs. Essentially, the different aspects that SMEs must consider before implementing cloud accounting have been overlooked.

2.2. Cloud Accounting Implementation in SMEs

Along with technological advancement, changing customer expectations are driving accountants to take advantage of technologies like cloud services. As part of cloud computing that delivers its services over the internet, cloud accounting specializes in processing financial data [13]. Fundamentally, below are preliminary considerations for SMEs prior to the implementation of cloud accounting [16]:

1. *Focus*: In most cases, IT development is not SME core competency. This means that relying on external vendors to manage their cloud accounting system is more cost-effective and reliable for SMEs since they could focus on value-adding activities to improve their core businesses instead.

2. *Agility*: Undertaking a considerable investment to develop a cloud system would restrict SMEs from immediately responding to the dynamic markets, competitive pressures, or other externalities due to the absence of resources. In contrast, purchasing an external cloud accounting system would only cost SMEs a certain amount of fees without having to assign people or spend some time to develop the system.
3. *Capital Expenditure*: As opposed to spending enormous capital for system development, SMEs could save a lot of funds by paying constant monthly or annual payments to cloud service providers. This benefit is significant for SMEs with significantly lower IT budgets than large enterprises.
4. *Scale*: SMEs with seasonal risks could manage the capacity of cloud accounting by increasing the capacity during peak seasons while reducing the capacity during low seasons. Thus, SMEs will not uselessly spend money on unused capacity.
5. *Accessibility*: Cloud accounting enables SMEs to access stored data anywhere and anytime as long as users can connect to the internet. This benefits owners and managers who are responsible for constantly monitoring the business.
6. *Staffing*: Vendor support allows SMEs to maintain the system without personally hiring technical staff.

Previous works of literature have disclosed various benefits of cloud accounting, which include cost reduction while simultaneously optimizing Accounting Information System (AIS) and Management Information System (MIS) [21], [22], [23], [24], [25]. Although cost reduction is advantageous for businesses in general, this benefit is favorable for SMEs since they would have a relatively lower IT budget than large enterprises, which may limit their internal IT development [26]. As a result, instead of making a huge investment in IT infrastructures, SMEs could rely on external parties that provide cloud accounting services without developing the system internally. Table 2 below shows the factors affecting SMEs' decisions in implementing cloud accounting:

Table 2. Factors Affecting SMEs Decision in Implementing Cloud Accounting

Factor / Article	[27]	[28]	[5]	[29]	[30]	[31]	[32]	[33]	[34]	[35]	[7]	[36]	[21]	[37]	[38]	[39]	[22]	[18]	[40]	Total
Security		X	X		X	X	X	X	X	X	X	X	X		X	X	X	X	X	16
Cost	X		X	X	X		X	X	X	X	X	X					X	X	X	13
Access				X	X	X		X		X			X			X	X	X		9
Accessibility	X				X					X			X			X	X	X		7
Functionality	X					X	X		X	X	X			X		X	X	X	X	11
Usability		X					X			X							X	X	X	6
Human Resource	X	X	X				X	X		X	X	X		X	X	X			X	12
Economy		X	X	X					X			X		X		X			X	8
Vendor Support				X					X				X		X					4
Collaboration (System Capabilities)	X					X										X				3
Integration							X				X					X			X	4
Collaboration (Necessities)	X					X										X				3
Connectivity								X			X									2
Time	X	X			X														X	4
Communication	X					X										X				3
Finance		X	X		X			X			X							X		6

3. Research Method

This qualitative descriptive research aims to illustrate the main factors that affect SMEs' decision-making in implementing cloud accounting. Primary data were collected through semi-structured and in-depth interviews with the key personnel who understand the implementation of AIS in their SMEs. The researchers selected interviews as the method for data collection to obtain more extensive information from the informants.

Table 3. SMEs Registered on Bandung Office of Cooperatives, Small and Medium Enterprises

No	Industry	Total
1	Handcraft	60
2	Culinary	96
3	Fashion	127
4	Service	120
5	Production	65
6	Others	101
Total SMEs		569

Source: Office of Cooperatives, Small and Medium Enterprises

Due to its reputation, Bandung has been recognized as one of the central points for Indonesia's Creative Economy. Currently, 4,285 SMEs are registered under Bandung Office of Cooperatives, Small and Medium Enterprises [41]. Given its abundant number of SMEs, Bandung has been selected as the focus of this research to represent Indonesia's SMEs. As for the sampling method, this study uses purposive sampling to filter the respondents by applying some inclusion criteria such as (i) the respondents must come from SMEs registered at the Office of Cooperatives, Small and Medium Enterprises; (ii) earn IDR300 million to IDR 50 billion per year; and (iii) have implemented computer-based accounting information system. Following the sampling selection process, the researchers narrowed down the target of the research by selecting a total of 69 SMEs with heterogeneous backgrounds. Moreover, this is in conformance with the study's objective in which the selected SMEs can be traced from Bandung Office of Cooperatives, Small and Medium Enterprises database. In addition, the selection process was also performed as an attempt to obtain a more holistic view and comprehensive perspective on cloud accounting implementation.

The variables of this research are the factors that have the potential to influence SMEs' decisions in determining whether to migrate to cloud accounting or not. To determine the key factors, researchers identified five categories discussed in previous literature and classified 16 factors listed in Table 2 into five categories. Descriptions for each factor are listed in the following [19], [28]:

1. Environmental Uncertainty

- a. Security: the degree to which SMEs believe that their data will not be lost, corrupted, or stolen since most cloud accounting users are storing their data on the public cloud provided by external vendors instead of in-house servers.
- b. Economy: the level of market competition faced by SMEs. In addition, the economy can be observed from industry growth in which the business operates and business competitiveness itself in the industry.
- c. Vendor Support: facilities offered by vendors in case of issues that could arise or customers' difficulties in employing the system. Vendor support includes cloud accounting training programs for employees, software and hardware maintenance, software updates,

improvement, and customization services that could adjust cloud accounting features to conform with SMEs' needs.

- d. Cost: the funds that SMEs require to implement cloud accounting. In general, the cost of cloud accounting services would differ depending on the SMEs' required features. Other costs that must be included are internet expenses since cloud accounting cannot operate without an internet connection. If the SMEs wish to have a more reliable employee to operate the technology, higher salary expenses are also expected.

2. *Task Uncertainty*

- a. Flexibility: the ability to alter or modify the systems to meet SMEs' needs. This factor supports SMEs' growth so that when the SMEs are targeting an expansion, cloud accounting would be able to adapt to changes.
- b. Functionality: the ability to satisfy all the things that the business process requires. Each industry has different kinds of needs and thus requires different features, especially between manufacturing, merchandising, and service industries. It is important for cloud accounting to satisfy all economic activities that occur in SME business processes.
- c. Access: the ability to facilitate access to data and systems. Internet connection enables cloud accounting to operate, and thus, the data stored on cloud accounting can be accessed anywhere and anytime according to the permission given to each role.
- d. Integration: the ability to interact with various systems without any redundant data. This factor is particularly important when migrating to cloud accounting because the transition phase is susceptible to redundant data. Moreover, this factor covers SMEs' ability to switch vendors so that vendor lock-in will not happen.

3. *Inter-organizational Uncertainty*

- a. Communication: the ability to facilitate communication with external partners such as suppliers and customers so that the processes before the transactions are recorded on cloud accounting.
- b. Collaboration (System Capabilities): the ability to assist workflow among partners. For example, the system could notify SMEs when the stocks are running out and help them reorder the same products from the corresponding suppliers.

4. *Capability of Information Process*

- a. Connectivity is the ability to connect systems internally and externally with other systems. It is preferable for cloud computing to be integrated even though SMEs use different vendors or platforms. With this, collaboration is not limited to the same vendor or platform.
- b. Usability: the system's suitability with SME business processes.
- c. Collaboration (Necessities): the ability to share data and information.

5. *Capability of Resources*

- a. Human resources: the employees' competence in implementing cloud accounting. Apart from that, SMEs' managerial knowledge of cloud accounting would be necessary to monitor the implementation of cloud accounting.
- b. Finance: SMEs' willingness to pay in implementing cloud accounting. However, it should be noted that cloud accounting contributions and the costs incurred would vary among SMEs.
- c. Time: the time spent on preparation and adaptation like employee training and development, etc. A newly established SME would require significantly less time than an established SME since a newly established SME does not have to perform the migration.

The result of preliminary interviews conducted by the researchers indicated that out of 69 relevant, active, and verified SMEs, 55 SMEs were still applying manual AIS, while the other 14 SMEs have computerized their systems. Subsequently, the researchers finally obtained eight informants giving consent to participate in this research. The number represented workable data based on those registered in Bandung

Office of Cooperatives, Small and Medium Enterprises, and additional adjustments. As a data collection technique, this study performed a semi-structured interview so that the researcher could have an open and extensive understanding of the respondents. The interview was conducted around the municipality of Bandung at the beginning of 2017. For each respondent, the interviews lasted for approximately 30 minutes. After obtaining the respondents' consent, the researcher recorded the whole interview while creating a draft transcript for documentation. After completing the transcript, the researcher proofread the interview transcript by verifying it with the recording. Miles et al. inductive model was applied as the technique for data analysis with stages described in the following [42]:

1. *Data reduction*: selecting only relevant data and simplifying them to improve comprehensibility. This stage begins with creating an interview transcript and continues by categorizing the informant's words into several factors. The strength of each factor would be determined by the frequency of that factor being mentioned by the informants.
2. *Data display*: transforming data into table, graph, or other visualization properties to provide a more comprehensive illustration regarding the data. This stage is essential to present data categorization from the previous stage to show the importance of each factor for each informant.
3. *Conclusion drawing and verification*: performing verification to ensure the validity of conclusions drawn. The visualization developed in the previous stage would show the strength of each factor based on how often it was mentioned and emphasized by the informants during the interview. The factors are then sorted according to their strength and verified through an expert verification process.

4. Result and Discussion

The researchers have interviewed a total of eight SMEs to participate in this research, with profiles presented in Appendix 1. Subsequently, the researchers analyze the interview transcript, identify any driving factor of cloud accounting implementation mentioned by the respondents, and summarize everything in Appendix 2. Afterward, the researchers formulated a table that ranks all the driving factors according to their strength or frequency, presented in Appendices 3 and 4. The more frequently a driving factor is mentioned, the higher its rank will be, as it is deemed to be a stronger factor being considered by business owners in determining the implementation of cloud accounting. The results of the interviews regarding the factors that influence SMEs' decisions in implementing cloud accounting are summarized in Appendix 3 and discussed in the following:

4.1. Interview Summary

A. Environmental Uncertainty

A.1. Security

Most informants expressed concern about security since the data are stored on the internet, especially the eight informants with IT backgrounds. On the contrary, informant 5 stated that SMEs do not require tight security since crucial private data are limited. In addition, informant 6 affirmed that even if the data were hacked and distributed, the SMEs would not be damaged since most of the data were not critical to the sustainability of the SMEs. Informant 6 was only concerned about the possibilities of data manipulation that could happen. Furthermore, the informants agreed that they trust an internal server more than the cloud. Informant 8 highlighted that they will not entrust their server to be managed externally.

A.2. Economy

Informants 4, 5, 6, and 7 believe that more complete, rapid, and accurate information produced by cloud accounting information systems would improve their business competitiveness. In contrast, other informants do not perceive the relationship between cloud accounting and business competitiveness.

A.3. *Vendor Support*

Some informants expressed their need for vendor support, while informants 1, 2, 7, and 8 stated they could manage everything internally. Informant 6 argued that SMEs would not have sufficient funds to recruit or hire an IT team specifically for cloud accounting implementation. Among the informants that were interviewed, only informant 5 internally implemented cloud accounting since it developed its software with the purpose of transforming it into its business line in the future. The existence of vendor support enables software customization to align with business needs, as mentioned by informant 6.

A.4. *Cost*

Informant 5, which is under cloud accounting software development, stated that the SMEs had spent approximately Rp100 million to develop the software, excluding Rp40 million for annual maintenance fees. However, other SMEs that bought from external vendors or given information of the costs of implementing cloud accounting stated that the costs were worth the features being offered by the system.

B. *Task Uncertainty*

B.1. *Flexibility*

Informants 2, 5, and 6 have experienced migration to the cloud accounting system. The three informants explained that they had to reinput their previous data into the database, which took a very long time to complete. In fact, informant 4 predicted that migration would become an obstacle since the process required a lot of data input. On the other hand, the remaining informants did not experience any challenges in conducting a migration.

B.2. *Functionality*

All informants agreed that the functions of cloud accounting information systems were worthy of implementation. However, informant 1 experienced incompatibility with the system and returned with Excel. Informant 1 also stated that the software he implemented on the SMEs was a better fit for retailers than the production in which his SMEs operate.

B.3. *Access*

Informants with managerial roles tend to desire flexible access to data to enhance the monitoring of the business. Among the eight informants, only informant 1 was comfortable and willing to access the data by contacting his employees. On the contrary, informants with employee roles expressed that the access factor did not influence them.

B.4. *Integration*

This factor became part of the considerations for SMEs with significantly larger employees.

C. *Inter-organizational Uncertainty*

C.1. *Communication*

The informants stated that they were comfortable communicating through the phone or short message service without the help of the features available on the cloud accounting system. They also argued that external partners would prefer that method as opposed to an automatic response from the system.

C.2. *Collaboration (System Capabilities)*

Informant 6 specifically said that collaboration with external parties via a cloud accounting system would be more difficult to execute since it could only be done if the partners used the same software.

D. *Capability of Information Process*

D.1. Connectivity

As mentioned previously, an internet connection is vital in connecting users with the data. This factor also supports integration, access, and collaboration factors. Informant 5 argued that this was not an issue since internet services were developing to be more reliable and affordable for society. Conversely, informant 8 believed that the current internet network in Indonesia was still unreliable. He did not want to take a risk and thus decided to utilize desktop software instead.

D.2. Usability

The statements from all informants indicated that currently no cloud accounting software was suitable for different kinds of SMEs in Indonesia, which led them to utilize Excel or develop their software.

D.3. Collaboration (Necessities)

All informants were still conducting manual collaboration in which the data transfer was performed through chatting applications, USB, e-mail, Bluetooth, etc.

E. Capability of Resources

E.1. Human Resource

Owners' knowledge of cloud accounting information systems significantly influences SMEs' decisions in implementing cloud accounting. According to the experience of informant 7, any proposals regarding systems change would be immediately rejected without consideration if the owners were not aware of cloud accounting. On the contrary, an employee's ability to operate a cloud accounting information system would not be problematic if training had been performed since, nowadays, people are more familiar with the technology. During the interviews, the researchers could see that informants who owned private servers did not have sufficient knowledge of how the data were stored on the internet. Most of them assumed that rented hosting to store the data is a server, while, in fact, there are other hosting companies that utilize the same server.

E.2. Finance

Most informants stated they did not mind spending the funds as long as the costs incurred corresponded with the budget. As an exception, informant 8 believed that finding the cheapest service providers was better and argued that subscription as a payment method was unsuitable for the cloud accounting system since he preferred to pay a one-off expense at the beginning that was not recurring.

E.3. Time

It can be concluded from the interviews that employees would not have a hard time adapting to the system because people are more familiar with technology nowadays. As for the migration, they believed it would take longer, especially if it were performed to transform a manual system into a cloud accounting. In contrast, migrating from Excel to cloud accounting would be much easier, mainly if the vendors provide import features.

4.2. Expert Verification

For the last step in the data analysis phase, expert verification was performed to ensure the credibility of the research findings. A programmer with experience developing cloud-based computer systems was involved in this process. According to the expert opinion, as seen in Appendix 5, "integration" is the strongest driving factor of cloud accounting implementation, followed by "connectivity" and "functionality", while "access" is at the bottom of the list. After that, the top ten driving factors based on informants' opinions were selected as the object for comparison between informant-expert views, as shown

in Figure 1. The grey area on the figure denotes the elimination process, resulting in seven verified strongest factors illustrated in Appendix 6 that affect SMEs' decision to implement cloud accounting. As seen in Figure 1, “collaboration”, “finance”, and “vendor support” were eliminated given that those three driving factors were not listed in Appendix 5, which means that those factors are not supported and verified by the expert.

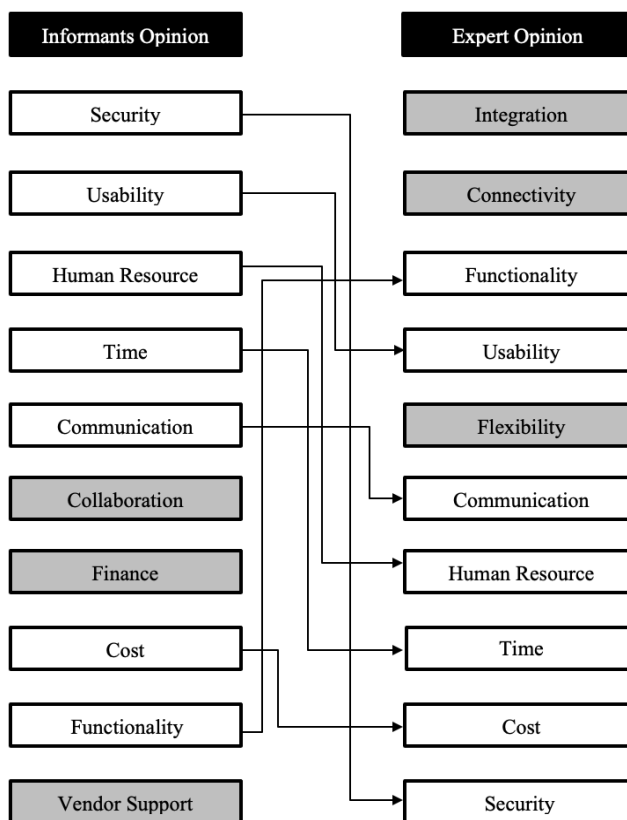


Figure 1. Verifying the 10 Strongest Factors Based on the Interviews

4.3. Verified Driving Factors

A. Security

Most of the informants prioritize this factor due to their concern about hackers. However, an informant agreed with the expert that the security provided by cloud accounting was sufficient for SMEs. On that account, it can be concluded that if SMEs are informed about the level of cloud accounting security, then this factor would not hinder the implementation of cloud accounting.

B. Usability

All the informants and the experts acknowledge that this is an essential factor since a system unsuitable for SME business processes would not be able to support SMEs in improving the speed and accuracy of the business process. The system incompatibility would only hinder performance and unnecessarily dispose of resources of the SMEs.

C. Human Resource

Employees' lack of competence in operating the system hinders the SMEs from implementing cloud accounting. Furthermore, the expert stated that user's lack of knowledge in implementing the system could threaten data security. Apart from the employees, this also applies to the managerial roles. Managers or owners with very limited knowledge regarding cloud accounting would face difficulties in developing, migrating, and implementing the system.

D. Time

This factor is particularly important in the migration process. Apart from operating normally, SMEs are expected to adapt to the new system simultaneously during the migrating period. For most SMEs, successfully migrating to a new system would require a very long time due to the enormous number of transactions that must be transferred. However, the expert explained that the developer will likely provide a solution during the migration period, even though it might take a long time. As long as SMEs can provide accurate and detailed mapping, the developer can shorten the migrating period.

E. Communication

In practice, SMEs tend to utilize *WhatsApp*, phone calls, and other commonly used communication media. The informants acknowledge the need for communication, but there have been concerns regarding compatibility in cases where external parties are not using the same platform as the SMEs. The expert explained that communication within a system is going to give a better result since a system would store the track record of each transaction. Hence, the concerns could be mitigated by features of the system that enable access from various platforms so that issues concerning incompatibility will not occur.

F. Cost

As mentioned previously, one of the benefits of cloud accounting is that it helps reduce costs since the users are only supposed to pay for the features. Although some informants object to the costs, this issue could be resolved with open-source cloud accounting that could be utilized without having to pay for the software costs. The expert also explained that the costs would be significantly higher without cloud computing because the hardware required to store data will cost a fortune. Thus, cloud accounting could be a solution for SMEs to reduce costs.

G. Functionality

Different kinds of SME business processes improve the importance of this factor. Some informants admitted that they were uncomfortable with the previous system since it did not include all the things that the SMEs needed. This is where cloud accounting came into the picture since its development could be adjusted with the SME business process. The expert also explained that the efficiency of this factor could be easily achieved as long as SMEs could provide an accurate and detailed mapping.

5. Conclusion

Many believe that cloud accounting has a crucial role in improving Indonesia's SMEs due to its capabilities, which enable local SMEs to focus more on the core of their valuable product and service processes. Despite the promising expectations, the study on cloud accounting adoption has been arguably scarce, especially in small and medium enterprises operations in Indonesia. To fill in the gaps, this article aims to identify the driving factors determining SME owners' and operators' adoption of cloud accounting. The results present, supported by interviews and expert verification, seven key factors encompassing security, usability, human readiness, time, communication, cost, and functionality. The use of multiple methods by cataloging literature-based initial factors, conducting interviews, and obtaining verification by domain experts help

support the comprehensive understanding of current phenomena, the cloud accounting adoption gap. The result provides relevant benefits not only to academia but also to public agencies like the SMEs Office, Communication and Information Technology Office, and the local SME community. This research warrants further improvement and extension, at least in two folds. First, the fairly small informants, though still very representative, could be added to improve the explanation power to a larger audience. This can be achieved by expanding and scrutinizing the municipality's database. Second, as the current study of cloud accounting and SMEs mainly targets conceptual context, further research can enrich the topic by looking at behavioral or case-based approaches. For instance, a study of how SME owners would navigate their cloud accounting features and layout would give an idea of how to improve the user interface and user experience, thus increasing the adoption. The authors hope this research provides a fruitful insight into the initial roadmap toward a greater understanding and development of Indonesia's small businesses and enterprises.

References

- [1] H. Widjojo, A. Fontana, G. Gayatri, and A. W. Soehadi, "Value Co-Creation Platform in Indonesian SME Community: SDL Perspective," *Journal of Developmental Entrepreneurship*, vol. 25, no. 2, pp. 1–22, 2020, doi: 10.1142/S1084946720500090.
- [2] P. Modisane and O. Jokonya, "Evaluating the benefits of Cloud Computing in Small, Medium and Micro-sized Enterprises (SMMEs)," *Procedia Comput Sci*, vol. 181, no. 2019, pp. 784–792, 2021, doi: 10.1016/j.procs.2021.01.231.
- [3] D. Assante, M. Castro, I. Hamburg, and S. Martin, "The Use of Cloud Computing in SMEs," *Procedia Comput Sci*, vol. 83, pp. 1207–1212, 2016, doi: <https://doi.org/10.1016/j.procs.2016.04.250>.
- [4] A. Khayer, Md. S. Talukder, Y. Bao, and Md. N. Hossain, "Cloud computing adoption and its impact on SMEs' performance for cloud supported operations: A dual-stage analytical approach," *Technol Soc*, vol. 60, p. 101225, 2020, doi: <https://doi.org/10.1016/j.techsoc.2019.101225>.
- [5] Y. Liu, A. Soroka, L. Han, J. Jian, and M. Tang, "Cloud-based big data analytics for customer insight-driven design innovation in SMEs," *Int J Inf Manage*, vol. 51, p. 102034, 2020, doi: <https://doi.org/10.1016/j.ijinfomgt.2019.11.002>.
- [6] D. Ma, R. Fisher, and T. Nesbit, "Cloud-based client accounting and small and medium accounting practices: Adoption and impact," *International Journal of Accounting Information Systems*, vol. 41, p. 100513, 2021, doi: <https://doi.org/10.1016/j.accinf.2021.100513>.
- [7] C. Christauskas and G. Miseviciene, "Cloud -Computing Based Accounting for Small to Medium Sized Business," *Engineering Economics*, vol. 23, no. 1, 2012.
- [8] Gartner, "Gartner Forecasts Worldwide Public Cloud End-User Spending to Grow 18% in 2021." Accessed: Sep. 21, 2021. [Online]. Available: <https://www.gartner.com/en/newsroom/press-releases/2020-11-17-gartner-forecasts-worldwide-public-cloud-end-user-spending-to-grow-18-percent-in-2021>
- [9] IDC, "Cloud Adoption and Opportunities Will Continue to Expand Leading to a \$1 Trillion Market in 2024, According to IDC," Business Wire. Accessed: Sep. 21, 2021. [Online]. Available: <https://www.businesswire.com/news/home/20201015005069/en/Cloud-Adoption-and-Opportunities-Will-Continue-to-Expand-Leading-to-a-1-Trillion-Market-in-2024-According-to-IDC>

- [10] A. Gupta, K. Kushansh, P. Santhanam, T. Osako, T. Nguyen, and Vaishali, "Ascent to the Cloud: How Six Key APAC Economies Can Lift-off," BCG. Accessed: Sep. 21, 2021. [Online]. Available: <https://www.bcg.com/publications/2019/economic-impact-public-cloud-apac/default>
- [11] R. K. Nistanto, "Mitos Keliru Orang Indonesia terhadap 'Cloud Computing,'" Kompas.com. Accessed: Sep. 25, 2021. [Online]. Available: <https://tekno.kompas.com/read/2013/12/05/1515411/mitos.keliru.orang.indonesia.terhadap.cloud.computing>
- [12] K. Surendro and A. Fardani, "Identification of SME readiness to implement cloud computing," in *International Conference on Cloud Computing and Social Networking (ICCCSN)*, IEEE, 2012. doi: 10.1109/ICCCSN.2012.6215757.
- [13] O. Dimitriu and M. Matei, "Cloud Accounting: A New Business Model in a Challenging Context," *Procedia Economics and Finance*, vol. 32, no. 15, pp. 665–671, 2015, doi: 10.1016/s2212-5671(15)01447-1.
- [14] S. Kamarudin, A. H. A Khalili, Z. F. A Aziz, K. A. Kamarudin, and A. N. A Wahab, "Exploring of Potential of Cloud Computing for Small and Medium Enterprises)," 2022.
- [15] F. Durao, J. F. S. Carvalho, A. Fonseka, and V. C. Garcia, "A systematic review on cloud computing," *J Supercomput*, vol. 68, no. 3, pp. 1321–1346, Jun. 2014, doi: 10.1007/s11227-014-1089-x.
- [16] T. Khanom, "Cloud Accounting: A Theoretical Overview," *IOSR Journal of Business and Management*, vol. 19, no. 06, pp. 31–38, 2017, doi: 10.9790/487x-1906053138.
- [17] S. Arvanitis, N. Kyriakou, and E. N. Loukis, "Why do firms adopt cloud computing? A comparative analysis based on South and North Europe firm data," *Telematics and Informatics*, vol. 34, no. 7, pp. 1322–1332, Nov. 2017, doi: 10.1016/j.tele.2016.05.013.
- [18] D. Yau-Yeung, O. Yigitbasioglu, and P. Green, "Cloud accounting risks and mitigation strategies: evidence from Australia," *Accounting Forum*, vol. 44, no. 4, pp. 421–446, Oct. 2020, doi: 10.1080/01559982.2020.1783047.
- [19] C. G. Cegielski, L. A. Jones-farmer, Y. Wu, and B. T. Hazen, "Adoption of cloud computing technologies in supply chains An organizational information processing theory approach," *The International Journal of Logistics Management*, vol. 23, no. 2, pp. 184–211, 2012, doi: 10.1108/09574091211265350.
- [20] K.-B. Ooi, V.-H. Lee, G. W.-H. Tan, T.-S. Hew, and J.-J. Hew, "Cloud computing in manufacturing: The next industrial revolution in Malaysia?," *Expert Syst Appl*, vol. 93, pp. 376–394, Mar. 2018, doi: 10.1016/j.eswa.2017.10.009.
- [21] S. M. Corkern, S. B. Kimmel, and B. Morehead, "Accountants Need To Be Prepared For The Big Question: Should I Move To The Cloud?," *International Journal of Management & Information Systems (IJMIS)*, vol. 19, no. 1, p. 13, 2015, doi: 10.19030/ijmis.v19i1.9085.
- [22] B. Ionescu, I. Ionescu, A. Bendovschi, and L. Tudoran, "Traditional Accounting Vs. Cloud Accounting," *Accounting and Management Information Systems - AMIS*, no. June 2013, pp. 1–21, 2014, doi: 10.13140/2.1.2092.8961.
- [23] P. Modisane and O. Jokonya, "Evaluating the benefits of Cloud Computing in Small, Medium and Micro-sized Enterprises (SMMEs)," *Procedia Comput Sci*, vol. 181, pp. 784–792, 2021, doi: 10.1016/j.procs.2021.01.231.
- [24] D. Pacurari and E. Nechita, "Some Considerations on Cloud Accounting," *Studies and Scientific Researches. Economics Edition*, no. 18, pp. 193–198, 2013, doi: 10.29358/sceco.v0i18.227.

- [25] R. D. Zota and L.-A. Fratila, "Cloud Standardization: Consistent Business Processes and Information," *Informatica Economica*, vol. 17, no. 3/2013, pp. 137–147, 2013, doi: 10.12948/issn14531305/17.3.2013.12.
- [26] A. Khayer, S. Talukder, Y. Bao, and N. Hossain, "Technology in Society Cloud computing adoption and its impact on SMEs' performance for cloud supported operations: A dual-stage analytical approach," *Technol Soc*, vol. 60, no. September 2019, p. 101225, 2020, doi: 10.1016/j.techsoc.2019.101225.
- [27] D. Ma, R. Fisher, and T. Nesbit, "Cloud-based client accounting and small and medium accounting practices: Adoption and impact," *International Journal of Accounting Information Systems*, vol. 41, p. 100513, Jun. 2021, doi: 10.1016/j.accinf.2021.100513.
- [28] M. Carcary, E. Doherty, and G. Conway, "The Adoption of Cloud Computing by Irish SMEs – an Exploratory Study," *Electronic Journal of Information Systems Evaluation*, vol. 17, no. 1, pp. 3–14, 2014.
- [29] F. Wulf, M. Westner, and S. Strahringer, "Cloud Computing Adoption: A Literature Review on What Is New and What Still Needs to Be Addressed," *Communications of the Association for Information Systems*, vol. 48, no. 1, pp. 523–561, 2021, doi: 10.17705/1CAIS.04843.
- [30] A. Wicaksono, M. Kartikasary, and N. Salma, "Analyze Cloud Accounting Software Implementation and Security System for Accounting in MSMEs and Cloud Accounting Software Developer," in *2020 International Conference on Information Management and Technology (ICIMTech)*, IEEE, Aug. 2020, pp. 538–543. doi: 10.1109/ICIMTech50083.2020.9211271.
- [31] D. A. B. Fernandes, L. F. B. Soares, J. V. Gomes, M. M. Freire, and P. R. M. Inácio, "Security issues in cloud environments: A survey," *Int J Inf Secur*, vol. 13, no. 2, pp. 113–170, 2014, doi: 10.1007/s10207-013-0208-7.
- [32] R. Vidhyalakshmi and V. Kumar, "Determinants of cloud computing adoption by SMEs," *Int J Bus Inf Syst*, vol. 22, no. 3, pp. 375–395, 2016, doi: 10.1504/IJBIS.2016.076878.
- [33] F. Weng and M.-C. Hung, "Competition and Challenge on Adopting Cloud ERP," *International Journal of Innovation, Management and Technology*, vol. 5, no. 4, 2014, doi: 10.7763/ijimt.2014.v5.531.
- [34] P.-F. Hsu, "A Deeper Look at Cloud Adoption Trajectory and Dilemma," *Information Systems Frontiers*, vol. 24, no. 1, pp. 177–194, Feb. 2022, doi: 10.1007/s10796-020-10049-w.
- [35] I. Baltatescu, "Cloud Computing Services: Benefits, Risks and Intellectual Property Issues," *Global Economic Observer*, pp. 230–242, 2014.
- [36] I. Senarathna, C. Wilkin, M. Warren, W. Yeoh, and S. Salzman, "Factors That Influence Adoption of Cloud Computing: An Empirical Study of Australian SMEs," *Australasian Journal of Information Systems*, vol. 22, Jun. 2018, doi: 10.3127/ajis.v22i0.1603.
- [37] M. A. AL-Shboul, "Towards better understanding of determinants logistical factors in SMEs for cloud ERP adoption in developing economies," *Business Process Management Journal*, vol. 25, no. 5, pp. 887–907, Aug. 2019, doi: 10.1108/BPMJ-01-2018-0004.
- [38] R. El-Gazzar, E. Hustad, and D. H. Olsen, "Understanding cloud computing adoption issues: A Delphi study approach," *Journal of Systems and Software*, vol. 118, pp. 64–84, Aug. 2016, doi: 10.1016/j.jss.2016.04.061.
- [39] D. S. Premarathne, N. Rajeshwaran, and E. K. Umayangana, "Determinants of Adoption of Cloud-based Accounting: A Paradigm Shift in Sri Lanka," *Asian Journal of Management Studies*, vol. 1, no. 1, pp. 103–127, Feb. 2021, doi: 10.4038/ajms.v1i1.29.

- [40] M. Zamzeer, Y. Alshamaileh, H. I. Alsawalqah, M. Al Hassan, E. J. A. Fannas, and S. S. Almbideen, "Determinants of cloud ERP adoption in Jordan: an exploratory study," *Int J Bus Inf Syst*, vol. 34, no. 2, p. 204, 2020, doi: 10.1504/IJBIS.2020.108342.
- [41] Dinas KUKM Kota Bandung, "Data UMKM." Accessed: Sep. 21, 2021. [Online]. Available: <http://diskopumkm.bandung.go.id/page/informasi-umkm>
- [42] M. B. Miles, A. M. Huberman, and J. Saldana, *Qualitative Data Analysis: A Sourcebook of New Methods*. Beverly Hills: Sage Publication, 2014.